PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to Terminal Connectors for Electrical Conductors

I, CHARLES DUNCAN HENRY WEBB, a British Subject, of 12, Holcombe Gardens, Ilford, Essex, (formerly of 78, Collinwood Gardens, Ilford, Essex), do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to terminal connectors for electrical conductors and is more particularly concerned with such connectors for use with electrical conductors comprising a conducting core having an insulating sheath therearound. It is an object of the invention to provide an improved terminal connector.

The invention provides a terminal connector for use with an electrical conductor comprising a conducting core having an insulating sheath therearound, which connector comprises a block having a hole therein for accommodating an end portion of the core of the conductor, the wall of said hole being provided with internal serrations and said block being formed of a conducting material which is deformable into gripping electrical contact with the end portion of the core of the conductor, and two spaced jaws secured to the block to receive therebetween a portion of the sheath of the conductor and which are deformable relatively towards one another into gripping engagement with the portion of the sheath therebetween.

Preferably the conducting material is a metal (which may be an alloy) and is both a good electrical conductor and soft enough to permit of ready deformation for clamping, while being harder than the metal of the core of the conductor. A suitable metal is brass.

Preferably the jaws are integrally formed with the block.

The invention also provides a connection assembly for providing an electrical connection between two conductors, each comprising a conducting core having an insulating sheath therearound, which assembly comprises two terminal connectors, each as aforesaid, for connection respectively to the two conductors, and a socket member for detachably receiving the two terminal connectors, which socket member provides an electrically conducting connection between the two terminal connectors. The terminal connectors may carry spring blades for fitting into recesses or slots in the socket member to retain the terminal connections therein.

One specific example of a connection assembly embodying the invention will now be described by way of example with reference to the accompanying drawings in which:—

Figure 1 is a longitudinal sectional view through the assembly and

Figure 2 is a fragmentary exploded view of the components of the assembly.

In this example the connection assembly is for providing an electrical connection between two insulated wires or cables and comprise two terminal connectors 11 which are fitted into opposite ends of a socket member 12 in which they are a tight sliding fit. Each terminal connector 11 is for connection to the end of an insulated wire or cable and comprises a rectangular brass or copper block 13 having a hole 14 of circular cross-section extending therethrough. The hole 14 has internal serrations along its length, which serrations lie in planes transverse to the axis of the hole, and are provided by the convolutions 15 of a screw thread. In use the bared ends of the wires or cables are inserted in the holes 14 of the blocks 13 and pressure is applied to opposite faces of the blocks 13 to deform or "crimp" those faces so that the serrations 15 are clamped against the conductors with such a pressure that the grip will respectively withstand a breaking strain on the wire or cable. The end 16 of each of the holes 14 is countersunk to facilitate introduction of the bared end of the wire or conductor and two jaws 17 spaced on opposite sides of the end 16 of the hole 14 extend away from the block. The

jaws 17 which are respectively integral with the blocks 13 are each in the form of rectangular plates which diverge slightly as they extend away from the block and the inner faces of the jaws 17 have serrations 18 in the form of V section ridges running in directions at right angles with respect to the axis of the hole 14. When the bared end of the wire or cable has been clamped in each of the blocks 13, as aforesaid, the ends of the insulating sheaths abut the blocks 13. The jaws 17 are now respectively pressed so that the serrations 18 thereon firmly engage the appropriate insulating sheath, thus providing effective and vibration-proof anchorages. The material of the insulating sheaths can spread and flow between the serrations 18 which is particularly important in giving a firm grip with material such as rubber, which is relatively incompressible. Heretofore grips have relied on direct and localized compression at points of contact and have therefore provided no really effective support.

The socket member 12 is provided as a rectangular sectioned metal tube and the terminal connectors 11 are retained therein by spring clips 21. Each clip 21 is of substantially U-shape, the base 22 of the clip being secured to the inner end of the appropriate block 13 and the ends of the arms of the clip 21 being formed as tongues 24 which engage in slots 25 in the socket member 12. The inner end of each block 13 is provided with a coaxial boss 16, which acts as tubular rivet, and over which the base 22 of the clip 21 is passed and the projecting end of the boss is spun or rivetted over to provide a secure fixing. Alternatively the clip 21 may be secured in place by brazing, welding or soldering its base to the block.

The socket member 12 is received within a channel sectioned member 27 and is a snug fit therein. The socket member 12 is retained against axial movement within the member 27 by deforming the corner portions 29 inwardly to engage in cut-out portions 31 in the socket member 12. The feature that the member 27 is of channel section enables a suitable instrument or pointer to be passed through the slot 25 to depress the tongues 24 from those slots and permit withdrawal of the terminal connectors 11.

The side walls of the member 27 are provided with contact tongues 32 for engaging the terminal connectors 11 to assist in making available a low resistance electrical path. For this purpose apertures 33 are provided in the member 12 through which the tongues 32 project. Alternatively a number of depressions may be provided in the walls of the socket member to engage the terminal connectors. It will be understood that the metal of which the socket member is made must possess a certain amount of "springiness" to permit of these measures. A further aid to good contact may be provided by the insulating sheaths of the wires or cables tending to force apart the aforesaid jaws into engagement with the socket member.

The terminal connectors and socket member hereinbefore described are of rectangular cross-section, but if desired circular or similar cross-sections may be used, alone or combined with rectangular cross-sections.

The assembly hereinbefore described may be surrounded by an insulating sleeve and, if necessary, a plurality of the assemblies may be used arranged in the form of tiers or stacks.

The invention is particularly suitable for the electrical systems of aircraft and military and civil vehicles and their associated equipment.

WHAT I CLAIM IS:—

1. A terminal connector for use with an electrical conductor comprising a conducting core having an insulating sheath therearound, which connector comprises a block having a hole therein for accommodating an end portion of the core of the conductor, the wall of said hole being provided with internal serrations and said block being formed of a conducting material which is deformable into gripping electrical contact with the end portion of the core of the conductor, and two spaced jaws secured to the block to receive therebetween a portion of the sheath of the conductor and which are deformable relatively towards one another into gripping engagement with the portion of the sheath therebetween, the opposed faces of said jaws being serrated.

2. A terminal connector as claimed in Claim 1, in which the conducting material is a metal and is both a good electrical conductor and soft enough to permit of ready deformation for clamping, while being harder than the metal of the core of the conductor.

3. A terminal connector as claimed in Claim 1, or Claim 2, in which the block is formed of brass.

4. A terminal connector as claimed in any one of Claims 1 to 3, in which the jaws are integrally formed with the block.

5. A terminal connector as claimed in any one of Claims 1 to 4, in which the serrations are provided by the convolutions of a screw thread formed internally in the hole.

6. A terminal connector as claimed in any one of Claims 1 to 5, in which the opposite surfaces of the jaws are provided with ridges extending in a direction at right-angles to the axis of the hole.

7. A terminal connector as claimed in Claim 6, in which the ridges are of V-shaped cross-section.

8. A terminal connector as claimed in any one of the preceding claims, in which the block is of rectangular cross-section and the hole extends longitudinally therethrough and is of circular cross-section.

9. A terminal connector as claimed in

Claim 8, in which the jaws are provided as two spaced plates extending outwardly from an end of the block.

10. A terminal connector as claimed in any one of the preceding claims, in combination with a socket into which the connector detachably engages.

11. A connection assembly for providing an electrical connection between two conductors, each comprising a conducting core having an insulating sheath therearound, which assembly, comprises two terminal connectors as claimed in any one of Claims 1 to 9 for connection respectively to the two conductors, and a socket member for detachably receiving the two terminal connectors, which socket member provides an electrically-conducting connection between the two terminal connectors.

12. A connection assembly as claimed in Claim 11, in which the or each terminal connector respectively carries a spring blade for detachably engaging in a recess or slot in the socket member to retain detachably the terminal connector therein.

13. A connection assembly as claimed in Claim 12, in which the spring blade is secured to the terminal connector intermediate its ends so as to provide two end portions for detachably engaging in two recesses or slots in the socket member.

14. A connection assembly as claimed in any one of Claims 11 to 13, in which the jaws are received within the socket member and are a close fit therein.

15. A connection assembly as claimed in any one of Claims 11 to 14, in which the socket is housed within a casing.

16. A connection assembly as claimed in Claim 15, in which the casing is formed of a conducting material and is provided with at least two spring contacts which respectively electrically engage the two connectors, whereby an electric circuit is formed between the connectors through the casing.

17. A terminal connector substantially as hereinbefore described with reference to, and illustrated in, the accompanying drawings.

18. A connecting assembly substantially as hereinbefore described with reference to, and illustrated in, the accompanying drawings.

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PROVISIONAL SPECIFICATION

Improvements in or relating to Terminal Connectors for Electrical Conductors

I, CHARLES DUNCAN HENRY WEBB, a British Subject, of 78, Collinwood Gardens, Ilford, Essex, do hereby declare this invention to be described in the following statement:—

This invention is concerned with terminal connections for electrical conductors. Such connections are applied to the ends of electrical conductors to facilitate their connection in an electric circuit.

It is an object of the invention to provide a terminal connection which can be readily and securely applied to the end of a conductor.

According to the invention a terminal connection for an electrical conductor comprises a metal block having a hole therein for accommodating an end of the conductor, said hole being provided with internal serrations and the metal of the block being deformable to clamp the serrations against the conductor.

The metal (which may be an alloy) is preferably both a good electrical conductor and soft enough to permit of ready deformation for clamping, while being harder than the metal of the conductor. A suitable metal is brass.

For use with a conductor having an insulating sheath, the metal block may be provided with jaws (preferably internally serrated) for clamping on to the sheath. Thus the terminal connection is even more firmly clamped in place.

In order to provide an electrical connection between two conductors, a connecting assembly may be provided comprising two terminal connections for connection to the conductors and a socket member for slidably receiving the terminal connections, which socket member provides an electrically-conducting connection between the two terminal connections. The terminal connections may carry spring blades for fitting into recesses in the socket member to retain the terminal connections therein.

The following is a description, by way of example, of terminal connections and a socket member embodying the above and other features of the invention.

A terminal connection for the end of an insulated wire or cable comprises a rectangular brass or copper block having a hole of circular cross-section extending therethrough. The hole has internal serrations along its length, which serrations lie in planes transverse to the axis of the hole, conveniently comprising a screw thread. The bared end of the wire or cable in inserted in the hole and pressure is applied to opposite faces of the block to deform or "crimp" those faces so that the serrations are clamped against the conductor with such a pressure that the grip will withstand a breaking strain on the wire or cable. One end of the hole is countersunk to facilitate introduction of the bared end of the wire or conductor and two jaws on opposite sides of

said end of the hole extend away from the block. The jaws, which are integral with the block, are in the form of rectangular plates which diverge slightly as they extend away from the block and the inner faces of the jaws have serrations in the form of V section ridges running in directions at right angles with respect to the axis of said hole. When the bared end of the wire or cable has been clamped in the block as aforesaid, the end of the insulating sheath abuts the block. The jaws are now pressed so that the serrations thereon firmly engage the insulating sheath, thus providing an effective and vibration-proof anchorage. The material of the insulating sheath can spread and flow between the serrations which is particularly important in giving a firm grip with material such as rubber, which is relatively incompressible. Heretofore grips have relied on direct and localized compression at points of contact and have therefore provided no really effective support.

For electrically connecting two terminal connections, a socket member is provided comprising a metal (e.g. brass) tube of rectangular cross-section, into opposite ends of which tube the terminal connections can be inserted with a tight sliding fit. A spring clip of substantially U shape is secured to the outer end of each aforesaid block (i.e. the end distant from the jaws). The outer end of the block lies in the base of the U so that the arms of the U extend on opposite sides of the block and the end of one of the arms is bent outwardly to provide a tongue directed away from the block. The clip may be secured in place by brazing, welding or soldering its base to the block. If preferred, a shoulder may be provided around the outer end of the hole in the block, this shoulder acting as a tubular rivet passing through a corresponding hole in the base of the clip and being spun or rivetted over to provide a secure fixing. For a good electrical and mechanical connection, a combination of both methods is preferred. The tongues on the two terminal connections fit into two apertures in the socket member, thus positively locking the terminal connections in that member. Further apertures are provided in the socket member opposite the arms carrying said tongues. Thus, by the insertion of a suitable pointer the arms can be moved to clear the tongues from their apertures, thereby permitting withdrawal of the terminal connections. The walls of the socket member are provided with contact tongues for engaging the terminal connections to asisst in making available a low resistance electrical path. The contact tongues may be partly or wholly sheared from the socket member (except for their roots). Alternatively a number of depressions may be provided in the walls of the socket member to engage the terminal connections. It will be understood that the metal of which the socket member is made must possess a certain amount of "springiness" to permit of these measures. A further aid to good contact may be provided by the insulating sheaths of the wires or cables tending to force apart the aforesaid jaws into engagement with the socket member.

The terminal connections and socket member hereinbefore described are of rectangular cross-section, but if desired circular or similar cross-sections may be used, alone or combined with rectangular cross-sections.

The assembly hereinbefore described may be surrounded by an insulating sleeve and, if necessary, a plurality of the assemblies may be used arranged in the form of tiers or stacks.

The invention is particularly suitable for the electrical systems of aircraft and military and civil vehicles and their associated equipment.

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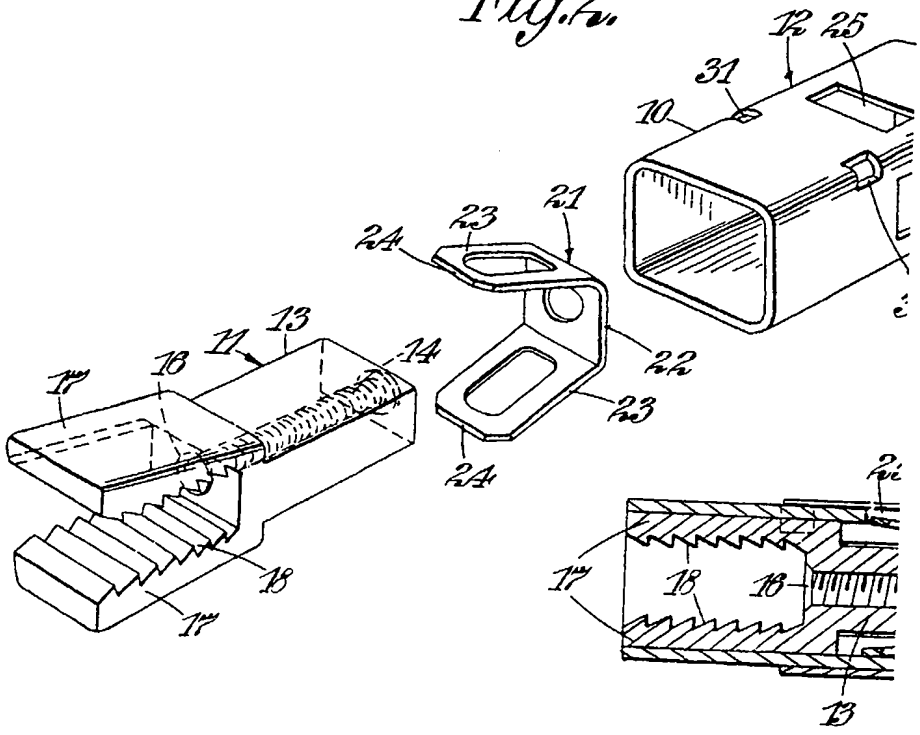
Fig.2.



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858,703 COMPLETE SPECIFICATION
1 SHEET

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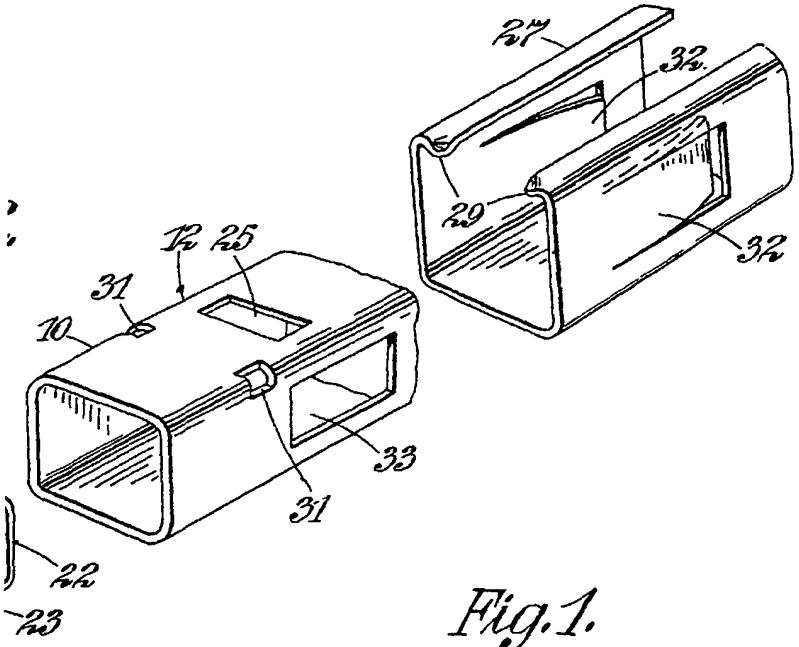

Fig. 1.

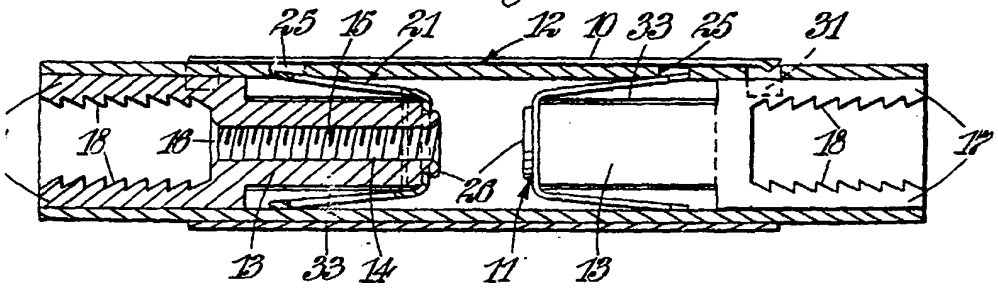

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Fig.2.

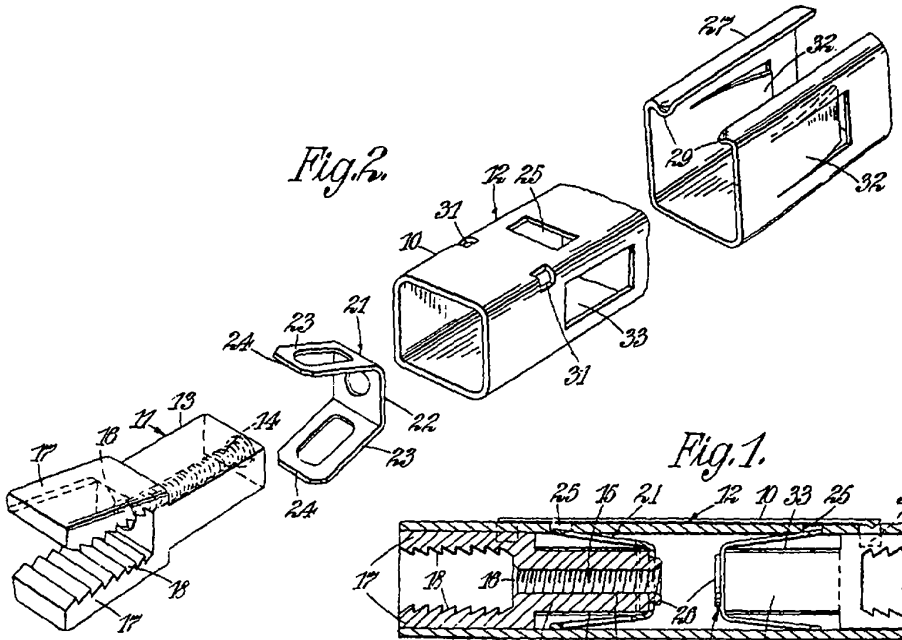

Fig.1.